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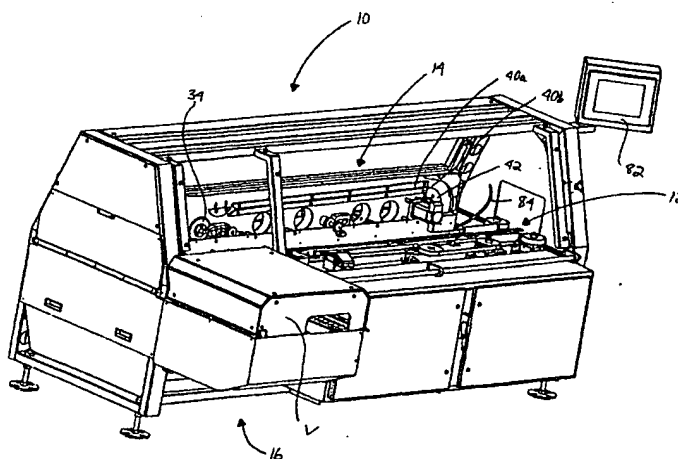
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(54) Title: **CARTON FEEDING AND FORMING MACHINE WITH SELECTIVELY ACTUATED LUGS AND RELATED METHODS**



(57) Abstract: A machine for intended use in feeding and completing a partially formed carton is disclosed. In one embodiment, the machine includes an overhead conveyor with selectively actuated, depending lugs that engage and convey the carton in a first direction while a first flap on a lid is folded and sealed. A takeaway conveyor includes selectively actuated, upstanding lugs that convey the carton in a second direction generally perpendicular to the first direction while second and third flaps are folded and sealed. The lugs on each conveyor may be closely spaced or overlapping to allow for selective actuation at a desired instant without the need for timing the corresponding chain or the carton feed to the machine. A diverter located at a transition between the forward and return runs of the overhead and takeaway conveyors actuates the lugs in a controlled fashion. Related methods of feeding and forming cartons are also disclosed.

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INTERNATIONAL SEARCH REPORT

PCT/US03/34067

A. CLASSIFICATION OF SUBJECT MATTER IPC(7) : B31B 1/04 US CL : 493/181 According to International Patent Classification (IPC) or to both national classification and IPC				
B. FIELDS SEARCHED Minimum documentation searched (classification system followed by classification symbols) U.S. : 493/162, 180, 181, 182, 183 Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched NONE Electronic data base consulted during the international search (name of data base and, where practicable, search terms used) NONE				
C. DOCUMENTS CONSIDERED TO BE RELEVANT				
Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.		
X	US 5,106,359 A (Lott) 21 April 1992; see entire reference.	1-19 and 83-95		
X	US 3,580,144 A (Renard) 25 May 1971; see entire reference.	1-19 and 83-95		
A	US 2,009,828 A (Wild) 30 July 1935; see entire reference.	ALL		
A	US 4,750,955 A (Haguenier) 14 June 1988; see entire reference.	ALL		
X, P	US 6,571,539 B2 (Gendre et al.) 03 June 2003; see entire reference.	20-82		
A	US 4,460,349 A (Charron) 17 July 1984; see entire reference.	ALL		
<div style="display: flex; justify-content: space-between;"> <div> <input type="checkbox"/> Further documents are listed in the continuation of Box C. </div> <div> <input type="checkbox"/> See patent family annex. </div> </div> <table style="width: 100%; border: none;"> <tr> <td style="width: 40%; vertical-align: top; padding: 5px;"> * Special categories of cited documents: "A" document defining the general state of the art which is not considered to be of particular relevance "E" earlier application or patent published on or after the international filing date "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified) "O" document referring to an oral disclosure, use, exhibition or other means "P" document published prior to the international filing date but later than the priority date claimed </td> <td style="width: 60%; vertical-align: top; padding: 5px;"> "T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention "X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone "Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art "&" document member of the same patent family </td> </tr> </table>			* Special categories of cited documents: "A" document defining the general state of the art which is not considered to be of particular relevance "E" earlier application or patent published on or after the international filing date "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified) "O" document referring to an oral disclosure, use, exhibition or other means "P" document published prior to the international filing date but later than the priority date claimed	"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention "X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone "Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art "&" document member of the same patent family
* Special categories of cited documents: "A" document defining the general state of the art which is not considered to be of particular relevance "E" earlier application or patent published on or after the international filing date "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified) "O" document referring to an oral disclosure, use, exhibition or other means "P" document published prior to the international filing date but later than the priority date claimed	"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention "X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone "Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art "&" document member of the same patent family			
Date of the actual completion of the international search 15 April 2004 (15.04.2004)	Date of mailing of the international search report <div style="font-size: 1.2em; font-weight: bold;">04 MAY 2004</div>			
Name and mailing address of the ISA/US Mail Stop PCT, Attn: ISA/US Commissioner for Patents P.O. Box 1450 Alexandria, Virginia 22313-1450 Facsimile No. (703)305-3230	Authorized officer Christopher R Harmon Telephone No. 703-308-1148 <div style="text-align: right; margin-top: 10px;"> Sheik H. Vency <i>Patent Specialist</i> <i>Tech. Center 3700</i> </div>			

x I Observations where certain claims were found unsearchable (Continuation of Item 1 of first sheet)

is international report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

☐ Claim Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:

☐ Claim Nos.:
because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:

☐ Claim Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

ox II Observations where unity of invention is lacking (Continuation of Item 2 of first sheet)

his International Searching Authority found multiple inventions in this international application, as follows:
lease See Continuation Sheet

☒ As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims.

☐ As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.

☐ As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims for which fees were paid, specifically claims Nos.:

4. ☐ No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

Remark on Protest ☒ The additional search fees were accompanied by the applicant's protest.
☐ No protest accompanied the payment of additional search fees.

BOX II. OBSERVATIONS WHERE UNITY OF INVENTION IS LACKING

This application contains the following inventions or groups of inventions which are not so linked as to form a single general inventive concept under PCT Rule 13.1. In order for all inventions to be examined, the appropriate additional examination fees must be paid.

Group I, claim(s) 1-9, drawn to a machine for conveying and folding.

Group II, claim(s) 10-19, drawn to a machine for conveying and at least partially folding comprising a rotatable wheel.

Group III, claim(s) 20-67, drawn to a conveyor.

Group IV, claim(s) 68-82, drawn to a system for receiving and conveying cartons.

Group V, claim(s) 83-88, drawn to a method of completing a partially formed carton.

Group VI, claim(s) 89-92, drawn to a method of completing a partially formed carton with three flaps.

Group VII, claim(s) 93-95, drawn to a method for conveying cartons along a path.

The inventions listed as Groups I-VII do not relate to a single general inventive concept under PCT Rule 13.1 because, under PCT Rule 13.2, they lack the same or corresponding special technical features for the following reasons: each has at least one special technical feature unique to its own group ie. rotatable wheel; takeaway conveyor; movable diverter; sensor and corresponding actuator; etc. Each group does not require the limitation(s) of any other group.